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OBSERVATIONS ON INFUSORIA, WITH DESCRIPTIONS OF NEW SPECIES.

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It is my purpose to give in this communication the chief results of such study as I have been able to bestow, during the past year, on Infusoria. My observations were made upon fresh water species found for the most part at Buffalo, N. Y.; some, however, were identified at Corunna, Mich. I have thought it worth while, remembering that one object of this Society is to afford mutual assistance, directly or indirectly, among its members in the study of nature, to state explicitly the habitats, time of occurrence and other circumstances under which the various forms were detected, and to record the identification of an interesting species even when nothing further could be added to what is already known concerning it; in consequence, some parts of the paper may take on the appearance of a mere catalogue of species. I do so, well aware of the fact that I am advertising this brochure as the work of an amateur, but so it is, for in science I am an amateur; it is a title of which I am proud.

It may be true that all forms of microscopic life have been neglected by American biologists—it is not equally true of all; still the hosts of the Legion, Infusoria, of our waters are almost wholly unknown, so far, at least, as published records indicate; so, as suggested recently by another, it may be best not to be “backward in coming forward” in this matter, even with humble observations. Prof. Joseph Leidy and Prof. H. J. Clark have each added materially to our knowledge of Infusoria and their work has been everywhere recognized; aside from their contributions only stray observations

and descriptions are to be found, with one exception which I take pleasure in mentioning, viz., the able papers by Dr. A. C. Stokes, occurring for the most part in recent numbers of the *American Monthly Microscopical Journal*, and the *American Naturalist*.

The family of the Vorticellidæ appears to be well represented as regards the number of both genera and species in the protozoic fauna of my neighborhood. I have studied the members of this group with more satisfaction than those of any other, and the bulk of this essay will be devoted to the family. I shall refer to the species encountered by me following the arrangement of *Kent's Manual of the Infusoria*. The vorticellids are usually the first to attract the attention of the student of Infusoria: their comparatively large size, high type of organization, almost endless variety of form and economy, as well as their abundance, quite naturally create intense interest in the learner. It is believed that the first infusorian recognized by man was a species of *Vorticella*; it was described by Leeuwenhoek in *Philosophical Transactions* (London), October 16, 1676.

No doubt all present, if not students of Infusoria, have encountered some individuals of the family whilst examining aquatic plants or *débris* from stagnant pond or flowing stream, or, it may be, attached to a fragment from an organic infusion, or attached to the shell or skin of a mollusk or on some aquatic worm, insect larva or crustacean. If you have met with any of these wonderful atoms you were surely arrested by their gracefulness and activity. The type of the family, Vorticellidæ, is exemplified in the genus, *Vorticella*. The zóoids of this genus are ovate, spheroidal or campanulate, attached posteriorly by a simple, *i.e.*, unbranched, longer or shorter contractile pedicle. The contraction is accomplished by a muscular fibrilla, spirally disposed in its center. The bodies are naked or are without protecting sheath or lorica. "The adoral system consists of a spirally convolute ciliary wreath, the right limb of which descends into the oral, or vestibular fossa, the left one is obliquely elevated and encircles the so-called rotatory, or ciliary disc; the entire adoral wreath is contained within and bounded by a more or less distinctly raised annular border—the peristome—between which and the elevated ciliary disc, on the vestibular side,

the widely excavated oral fossa or vestibulum is situated; the vestibulum is further continued into a conspicuous cleft-like pharynx, and finally terminates in a narrow tubular œsophagus. * * *

* * The contractile vesicle is single,* spherical, situated close to and debouching into the vestibulum. The endoplast is more or less elongate or band-like." (Kent.) With this type the different genera may be compared; the structure of the zooids is essentially the same in all; with few exceptions, *e. g.*, *Opercularia* and *Pyxidium*, the separation of the Legion into genera and the grouping of the genera depend upon the presence or absence or some peculiar character of the pedicle, or the presence or absence or character or posture of the lorica. The first group of genera are illoricate, the second loricate, the third with soft, mucilaginous, solitary sheath.

Of the twenty-one genera I have identified representatives of all but five, one of which, *Stylochona*, is not known to have fresh water species, and, as will appear in the sequel, I have proposed a new genus for a pedicled, loricate species otherwise agreeing with the procumbent species of *Lagenophrys*.

Sub-Family I., VORTICELLINA.

I. *Gerda*. I have not found any species which could be with certainty referred to the genus. A form possibly belonging to it occurs rarely on the swimming feet of the cray-fish in the Niagara river.

II. *Scyphidia*. Four species of these sessile, sucker attached infusorians have been detected.

1. *S. limacina*, Lachm, occurs at Buffalo on a small *Planorbis*, its attributed European host. Examples of the Mollusk taken in June from ponds often bore numerous examples, the zooids clothing the antennæ and exposed parts of the body-surface. Lachmann's figure, if I am correct in the identification of our local form, is not good. It represents the body as barrel-shaped, coarsely striate or rugose transversely, with the peristome much narrower than the width of the body. I have found the zooids, when active, nearly cylindrical, the peristome as wide or wider than the body which is slightly constricted below the border. The cuticle is transversely striate, but

* Dr. A. C. Stokes has discovered at Trenton, N. J., a species, *Vorticella Lockwoodii*, which has two contractile vesicles. *Am. Nat.*, 1884, page 829.

not so coarsely as represented. Again, the thickened posterior border is set obliquely to the axis of the body, so when expanded the zooids stand out at an oblique angle. If one of the host's antennæ, for example, be removed and placed in a compressorium, the zooids seated on it soon become sluggish and take much the same shape as represented by Lachmann's figure. This fact and the similar host convince me that our species is identical with *limacina*. The endoplast is short, thick and curved. There occurs amongst the social groups of the infusorian one with the body so much contracted posteriorly that it appears stalked similarly to *S. inclinans*. Concerning its identity I am undecided; it seems to represent some stage or condition of *limacina*; standing alone it would doubtless be considered distinct.

2. *S. Fromentellii*, Kent. In his manual, W. S. Kent refers to certain instances in which *Daphnia pulex* was "extensively infested with a minute, sessile vorticellidan agreeing in all respects, except for the presence of a single, normally located, contractile vesicle, with the species under consideration." I have likewise found on *Daphnia*, *Cyclops*, and *Sida* a form which I think may be the same; it is smaller, however, than the recorded dimensions of *Fromentellii* and has a normal, contractile vesicle. The same or a similar animal occurs on *Gammarus pulex*, usually clustered in the articulations of the legs or body. I have been much perplexed by this minute vorticellidan.

3. *S. inclinans*, D'Udekem. This species has been obtained abundantly upon a *Nais* which abounds on water-plants in ponds. The zooids usually occur about the anterior part of the host. The surface of *inclinans* is said to be smooth; in ours it is finely striate transversely. Care is required in the management of the illumination to demonstrate the striate character. The peristome and ciliary disc also differ from D'Udekem's figure of *inclinans*, reproduced in Kent's Manual, plate 34-2; the former is slightly thickened and the disc is little more than half the width of the anterior border and only slightly raised above it. The length of the expanded zooids $\frac{3}{8}$ to $\frac{1}{4}$ of an inch. I have little doubt about the genuineness of the species and, notwithstanding the differences I have mentioned, that our form is identical with *inclinans*. The

outline of the body is the same, the host is similar and the characteristic bending of the body to one side on contraction agrees perfectly.

An interesting variety of this *Scyphidia* has come under notice. It occurs on the long-forked setæ of the *Nais*. (Fig. 1, plate iii.) The variety was found previously to finding the normal zooids already mentioned, and was until then regarded as an undescribed species, but after studying *inclinans* I concluded that it was a variety of that species. It agrees in size, very well in form, the peristome and disc are similar, the surface very delicately striate, and the body is drawn to one side or nods on contraction. The adherent apparatus is different, apparently rendered so by its attachment to the spine, *i. e.*, it becomes forked or bilobed. The posterior third is somewhat less attenuate than the normal form as figured by D'Udekem or as observed by myself. It is a novel sight to obtain a worm with these animalcules attached, often in pairs, to nearly every one of its ventral spines, when they resemble pendant, ornamental jewels. It may be worth noting that the variety was discovered on Nais from a certain pond at Fort Erie, Ontario, whilst at the same date the normal form was as common in ponds across the river near Buffalo. The two sorts have not been taken from the same locality. In a few instances the zooids have been observed to develop posterior cilia, loose their hold on the spine, and swim about in a very lively manner. Their form in this stage is nearly globular.

4. *S. ovata*, *n. s.* (Fig. 2, pl. iii.) The body is ovate, attenuate posteriorly and attached by the usual acetabuliform disc; it is less than twice as long as broad; the surface very delicately transversely striate. The peristome not everted, the body slightly constricted below the anterior border, the width of the ciliary disc exceeds half the width of the body, somewhat convex and elevated above the peristome. Endoplast granular, thick and curved. Endoplasm granular. Length of body $\frac{1}{10}$ to $\frac{1}{80}$ of an inch. Pond-water, attached to the skin of an aquatic worm.

This species differs from *inclinans* in form, in being of much smaller size and in taking a nearly globular form when contracted; it differs from *Fromentellii* in being much smaller, in the character of the ectoplasm, in wanting the longitudinal plications on the attenuate posterior part of the body and smooth surface above.

The worms from which the infusorians were taken were common

among the roots of aquatic plants in a swamp, June, 1884. The anterior part was often completely clothed by the clustered zooids.

III. *Spirochona*, and IV. *Stylochona*. No species detected.

V. *Rhabdostyla*.

R. ovum, Kent. Not uncommon.

There is a small representative of the genus frequently met with on Crustacea. When it contracts, the rigid pedicle penetrates the body, the animal apparently sitting impaled upon the host.

VI. *Pyxidium*. A representative of this genus makes itself at home on the skin of a small *Planorbis* from ponds at Buffalo. Its length equals $\frac{1}{4}\frac{1}{8}$ of an inch when extended, its outline then agreeing closely with that of *Scyphidia inclinans* as figured in Kent's Manual, plate 34-2; when retracted it is somewhat pyriform, inclined by bending its stalk as do other *Pyxidia*, with a snout-like process. The surface is smooth. In disc and capacious vestibulum it resembles precisely an *Opercularia*. Many examples have been observed on one Mollusk.

VII. *Vorticella*. I have identified with certainty comparatively few of the numerous species. These are the following:

1. *V. nebulifera*, Ehr.
2. *V. longifilum*, S. K.
3. *V. campanula*, Ehr.

I cannot well express the luxuriant abundance of this *Vorticella*, particularly in autumn when acres of aquatic plants along the Niagara are literally covered by a "thick bluish-white slime" composed of these infusorial molecules. By a careful management of the illumination I have demonstrated that this species, although placid in the group having smooth cuticular surface, is really beautifully striate.

4. *V. microstoma*, Ehr.
5. *V. putrinum*, Müll.
6. *V. elongata*, From.

Taken singly on aquatic plants from swamp water, June, 1884. I found it to agree very closely with Kent's figure plate 35-25.

7. *V. chlorostigma*, Ehr.

Observed forming large green patches on leaves and sticks in a small forest-pool, May, 1884, also taken on molluscan shells and

algæ in ponds fed by water from the Niagara. The outline of body agrees more closely with *V. spectabilis* (Kent, plate 49, figs. 33 and 36) than with that attributed to *chlorostigma*. The form, however, is quite variable; when confined a short time in a small supply of water they shorten their bodies, becoming wider posteriorly, resembling then *V. fasciculata*. Under a moderately high magnification *chlorostigma* is truly an elegant object, the edges of the bell and the edges of the optical section appearing beautifully moniliform. Miss J. A. Sallitt (*Jour. Roy. Mic. Soc.*, iv., 402) says, "In *V. Chlorostigma* no corpuscles are present, but the chlorophyll is apparently diffused through the endoplasm." This is not in accordance with my observation. I find the green corpuscles filling the parenchyma, rather constant in spheroidal form and varying in diameter from $\frac{1}{3200}$ to $\frac{1}{5000}$ of an inch.

8. *V. convallaria*, Linn.

W. S. Kent remarks that "This species represents one of the first discovered infusorial forms, it being identical with the so-called animalcule of the first size described by Leeuwenhoeck in *Philosophical Transactions*, London, in 1675, and which subsequently received from him the more distinctive title of Bell-like Animal. * * * Linnæus in *Systema Naturæ*, Ed. XII., 1769, conferred upon it its generic title of *Vorticella*.

VIII. *Carchesium*.

1. *C. polypinum*, Linn. Occurs in great profusion during May, attached to submerged objects of all sorts in the Niagara river. It may certainly claim the palm for abundance from *V. campanula* and *E. flavicans*. It is comparatively rare in the same waters at other seasons. I have found it in plenty in the Shiawassee river, Michigan, during July.

When the plants to which the colonies are anchored have been kept for some time in a limited supply of water, the zooids loose from their stalks and establish new colonies. The young groups, at the end of a day or two, consist of a long retractile stalk bearing a cluster of several sessile zooids of the usual form; these infant colonies suggest forcibly the possibility that *Zoothamnium simplex*, Kent, may be only the young of some other species of its genus or of *Carchesium*. It is true that the zooids of *Z. simplex* differ from

those of any *known* species of either genus, while those of the initial stocks of *polypinum* are normal or agree with the adult stage.

Among the colonies obtained in the spring at Buffalo I have observed no very marked variation in size, but there are two very distinct forms of body; so it seems to me that the only valid difference between *Carchesium* and *Zoothamnium* depends upon the continuity of the muscular fibrilla of the compound pedicle of the latter and its interruption at each bifurcation in that of the former.

The following commensal Infusoria have been noted on the zoodendria: *Monosiga brevipes*, often in large numbers, at Corunna, *Trichophrya epistylidis*, *Podophrya carchesii* and *Podophrya quadripartita*, all common at Buffalo.

2. *C. Lachmanni*; Kent. Erie canal and Niagara river, Buffalo.

3. *C. aselli*, Engelmann. In abundance on *Asellus*, Niagara river, July. Agrees in all points with characters attributed to it except that its cuticle is *not smooth*.

IX. *Zoothamnium*.

1. *Z. arbuscula*, Ehr.

On *Myophyllum*, Corunna, in July, not common.

2. *Z. affine*, Stein.

In profusion on *Asellus aquaticus* in early spring, from the Niagara.

3. An interesting *Zoothamnium* occurs on the crustaceous parasite, *Lerneocera cruciata*. I have not identified it.

X. *Epistylis*.

1. *E. anastatica*, Linn.

2. *E. plicatilis*, Ehr.

An interesting green variety, scarcely less common than the normal form, occurs at Buffalo attached to molluscan shells and plants. The parenchyma is filled with bright green corpuscles similar to those of *Vorticella chlorostigma*. Examples kept in a small beaker of water for many days retained their brilliancy undiminished. It agrees in all particulars with *plicatilis* except in color, and occurs in connection with the usual form; it is certainly a very conspicuous and lovely *Epistylis*. If this is a case of invasion by a parasitic alga, as it appears to be, *Vorticella chlorostigma* would appear to afford another example.

3. *E. Niagara*, Kellicott.

4. *E. flavicans*, Ehr. Exceedingly abundant in the Niagara, especially in autumn.

5. *E. digitalis*, Ehr. In profusion on *Cyclops* from forest ponds in May.

6. *E. brevipes*, C. and L. This species has been referred to the genus *Rhabdostyla* by Kent, but I think I have evidence that it is an *Epistylis* and that it should be restored. In July I found that the antennæ of *Gammarus pulex* from the Niagara were often almost covered with a vorticellidan which agrees extremely well with all that is recorded of *E. brevipes*, save the fact that of the several, six or more were counted, zooids occupied a common excessively short pedicle. There can be no doubt about the genus of the species in question; it may not be *brevipes*, if not, it appears to be unnamed.

Epistylis fugitans, n. s. (Fig. 3, plate iii.) Body when fully extended sub-cylindrical, two and one-half times as long as broad, attenuate posteriorly; soon after capture the body becomes relatively shorter and somewhat ovate; surface coarsely striate transversely. The peristome is slightly thickened. ciliary disc narrow and somewhat elevated above the peristome. In contraction the body is top-shaped, not plicate posteriorly nor pendulous. Pedicle short, rarely exceeding the length of the body, often less than half its length, slender, hyaline; secondary pedicle very short, so that the zooids sometimes appear sessile on the primary stalk. The colonies consist of few individuals. Length of zooids $\frac{1}{800}$ to $\frac{1}{400}$ of an inch. Attached to *Sida* in early spring.

This species appears to possess characters in common with both *E. pyriformis* and *E. tubificis* of D'Udekem. I have ventured to separate it on the following grounds: it is much smaller than either; its surface is so coarsely striate that the character could not have been overlooked and described as smooth as the species are with which it must be compared; it has not been observed to become pendulous as does *tubificis* or plicate like *pyriformis*.

Examples of *Sida* from a road-side pool in May afforded numerous examples of the infusorian. The specific name proposed alludes to the curious habit of leaving the colony support so hurriedly on capture of the host. They loose from their pedicles by spinning top-like, until separated, by means of their anterior cilia. The rapidity of their rotation almost defies counting; the spinning is often continued long after the animal is free. These

wandering zooids appear soon to re-establish themselves, secreting a new pedicle, and before sub-division appear like a *Rhabdostyla*.

XI. *Opercularia*.

1. *O. nutans*, Ehr. Is not at all uncommon on *Myriophyllum* and *Chara* at Buffalo and Corunna. In some examples not distinguishable from the normal form, the branched pedicle was found to appear smooth or longitudinally striate until moderately high power and careful illumination disclosed faint transverse striæ. Others exhibit distinct annulations.

2. *O. stenostoma*, Stein. Not uncommon on *Asellus*. I have often met with a species on *Cyclops* which appears like the same.

3. *O. elongata*, n. s. (Fig. 4, plate iii.) Body elongate, cylindrical; length four to five times the width, somewhat attenuate posteriorly, slightly narrowed anteriorly and truncate, plicate below the border when the disc is retracted; cuticular surface finely striate transversely. The ciliary disc is wide and very much elevated, double row of cilia, membranous collar as in *articulata*. Contractile vesicle situated near the bottom of the spacious vestibulum. In contraction the posterior third of the body becomes plicate and the animal often nods like *nutans*. The pedicle branches dichotomously, longer than the body, annulate; secondary branches half the length of the pedicle.

Length of zooid $\frac{1}{80}$ to $\frac{1}{40}$ of an inch. On aquatic plants in pond-water.

This most beautiful and distinct species should be compared with *stentorium* and *cylindrata*. It is of the size of the former, but differs in outline of bodily form, has a much longer pedicle, the peristome is broad whilst it is narrow in *stenostoma*; again, the membranous collar is conspicuous in this one but not so in the other. It is much larger than *cylindrata*, but similar in form and markings of surface; the peristome and disc on the other hand are decidedly different; the pedicle also is not tall as in *cylindrata* nor colored brown, nor are the zooids numerous, usually four to twice as many. I have occasionally met with colonies of sixteen.

4. *O. rugosa*, n. s. (Figs. 10 and 11, plate iii.) Body elongate, somewhat fusiform, attenuate posteriorly, two and one-half times as long as broad, peristome thickened, collar-like, the ciliary disk about half as wide as the anterior border, not more elevated and oblique than that of *Lichtensteinii*, the disc mounted upon a pedicle like column moving piston-like in the peristome; the membranous collar not conspicuous, reaching but little above the peristome border; the capacious vestibulum extends down one-third the length of the body; nucleus linear, curved, transverse, situated at the widest part of the body; contents of the body brownish,

fine granular with numerous green spheroidal bodies interspersed; surface of cuticle smooth, when the body is contracted the surface is plicate or rugose transversely for two-thirds its length; the snout-like anterior prolongation is also plicate longitudinally.

The pedicle (fig. 10) is very stout, corymbously branched, each branch bearing at its summit a few or as many as forty sessile zooids which when partially contracted present the appearance of a globular head resembling the groups of *Anthophysa vegetans*. The long pedicle is prismatic rugose like a cluster-column, or simply striate with an occasional transverse division or articulation. The summits of the branches are capitate and bear the groups of zooids on their table-like surfaces which are divided into hexagons by ridges. Mature colonies reach the height of $\frac{1}{10}$ of an inch or more; length of zooids $\frac{1}{16}$ to $\frac{1}{8}$ of an inch. In rather foul water on plants, Scajaquada creek, Buffalo, N. Y., August, 1884.

This species is quite distinct in the characters of the zooid, and clearly so in those of the pedicle, as well as in the position of the zooids clustered at the summit of the branches. The zoodendrium appears to be composed of the individual stalks cohering as they elongate, thus accounting for the prismatic form and rugose surface. Occasionally a single zooid possesses a single narrow pedicle which has failed to cohere to its fellows. The stalks remain hyaline but are often loaded with rotifers, diatoms, etc.

Sub-Family II., VAGINICOLINA.

XII. *Vaginicola.*

1. *V. Crystallina*, Ehr.
2. *V. tincta*, Ehr.

XIII. *Thuricola.*

1. *T. Valvata*, Wright.
2. *T. innixa*, Stokes (fig. 5, plate iii.), described by Dr. A. C. Stokes in *American Monthly Microscopical Journal*, vol. iii., 183. It occurs at Buffalo and Corunna on *Nitella* and other water-plants. I find the lorica often more attenuate posteriorly than indicated by Dr. Stokes' figure, and the pedicle attaching the zooid to the bottom of the lorica much longer also; the aperture is sometimes slightly everted. The sheath remains hyaline in age. Parenchyma filled with unusually large corpuscles resembling blood corpuscles of the Crustacea. Length of lorica $\frac{1}{16}$ to $\frac{1}{8}$ of an inch.

XIV. *Cothurnia.*

1. *C. Imberbis*, Ehr.

2. *C. variabilis*, D. S. K.

3. *C. lata*, D. S. K. Large numbers of the loricae examined, attached to *Canthocamptus minutus* from forest-ponds in May. I have not yet been able to catch the zooid expanded. The body subdivides in the shell, after which one individual acquires posterior cilia and leaves the parent. The migrating one (Fig. 6, plate iii.) is cylindrical, with a handle-like posterior protuberance.

XV. *Pyxicola*.

1. *P. pusilla*, Kent, common in Scajaquada creek, Buffalo.

2. *P. striata*, n. s. (Fig. 7, plate iii.). Lorica urceolate, curved, somewhat gibbously inflated, length two and one-half times the greatest width, constricted below the aperture, which is oblique; the upper half of the lorica with ten or more transverse striations; posteriorly acute, extending down the pedicle a short way tube-like. Lorica amber color varying with age; operculum same hue, conspicuous; length of lorica $\frac{3}{16}$ of an inch. Pedicle hyaline, straight, one-fourth or one-fifth as long as lorica. Zooid sub-cylindrical, protruding about one-fifth of its height beyond the lorica.

This form occurs singly on *Myriophyllum* and *Algæ*, Shiawassee river, Corunna, July, 1884. It is considered new mainly because the lorica is anteriorly so clearly striate and the posterior termination of the lorica peculiar.

XVI. *Pachytrocha* and XVII. *Stylocola*. No representatives detected.

XVIII. *Platycola*.

1. *P. decumbens*, Ehr., occurs in large numbers on the shells of *Ancylus fusca* and aquatic plants. Our form differs from published figures of *decumbens* in being nearly orbicular instead of oval, the posterior margin being rounded more obtusely than is indicated for *decumbens*.

2. *P. striata*, Fromentel. Not common, on *Anacharis*.

3. *P. longicollis*, Kent. The form thus identified differs from the diagnosis and figure of *longicollis* in that the "obliquely elevated neck" is not so long nor the aperture so much dilated (fig. 8, plate iii.). Should it prove to be distinct it may be called appropriately *P. intermedia*. On aquatic plants from ponds and Niagara river.

XIX. *Lagenophrys*.

1. *L. Vaginicola*, Stein. Very many on *Canthocamptus minutus* from ponds in the forest in early spring.

2. *L. ampulla*, Stein. Extremely abundant on legs, branchiæ and body of *Gammarus pulex*, less common on *Asellus aquaticus*. I find the loricae nearly orbicular, resembling "a plano-convex circular lens," but not "having an anterior projecting everted rim in front of the oral aperture, ornamented with a moniliform pattern." The aperture is very much the same as in *vaginicola*, i.e., with two, upper and lower, smooth-margined lip-like processes, which are raised or depressed when the inclosed animal protrudes or retracts itself; even when raised they do not extend beyond the anterior margin of the lorica, being situated on the convex front back of the front edge. After the animal becomes lethargic or dies in consequence of confinement in stale water, these lip-like processes are often pushed out in front, sometimes giving the appearance of an anterior projection; its edge, however, is not moniliform so far as I have been able to make out under good objectives.

3. *L. nassa*, Stein. I have taken rarely on *Gammarus* an example of *Lagenophrys* which appears to be *nassa*. I have not made out the "peculiar character of the lip-like anterior prolongation" so clearly as I could wish.

XX. *Stylohedra*, n. g. Lorica erect, attached posteriorly by a distinct pedicle; otherwise both lorica and animalcule as in *Lagenophrys*.

The single species for the reception of which I propose this genus may have been referred to *Lagenophrys* by simply amending its formula by adding "erect and pedicillate" after "lorica adnate, or laterally attached." It is, however, structurally as distinct from that genus as *Cothurnia* is from *Vaginicola*.

Stylohedra lenticula, n. s. (Fig. 9, plate iii.) Lorica seen from above ovate, from the side lens-shaped with the edge rounded, slightly truncate anteriorly, smooth, transparent, pedicillate. Pedicle one-fourth to one-fifth the length of the lorica, joined to the host by means of a distinct disc. The circular anterior opening is guarded by two horizontally placed valvular processes which open as the animalcule protrudes and close on its retraction. The edges of these valves are thickened and semi-circular, the part of the lorica to which they are attached being flexible; these lip-like bodies may be pushed out or retracted below the edge of the shell. The zooids nearly fill the loricae; ciliary disc similar to that of *L. vaginicola*. Length of lorica $\frac{1}{16}$ of an inch, attached to the legs of *Gammarus pulex*, from Mud lake, near Owasso, Mich.

Sub-Family III., OPHRYDINA.

XXI. *Ophionella*.

O. picta, Kent. Attached to *Nitella* from a ditch on Squaw Island,

Niagara river, June. There can be no doubt, I think, about the identity of the form observed. Very few examples seen.

XXII. *Ophrydium*.

1. *O. versatile*, Müll. I have elsewhere stated the enormous quantities of this lovely animal during July, 1882, in Round Lake, Petoskey, Michigan, as observed by Mr. Harry A. Wood and myself. It also occurs in some profusion in the Niagara at Buffalo, and Prof. Hamilton L. Smith, at the Elmira meeting of this Society, described to me the mucilaginous zoocytia, filled with stray diatoms, taken from Seneca Lake. It thus appears to be distributed throughout eastern North America.

2. *O. Eichhornii*, Ehr. Occurs on the under side of stones along Bird Island pier, Niagara river. Noticed only in autumn.

It is expected that further search will bring to light many additional species of Vorticellidæ inhabiting ponds and streams about Buffalo. It seems worth mentioning that, so far, only one species has been detected with a jointed or articulate pedicle, and that the cuticular surface of most species described as smooth in the manuals prove to be striate by careful illumination and the use of sufficient magnifying power.

TENTACULIFERA.

It appears that the Tentaculifera are not represented by a relatively large number of species in the vicinity of my home; at least they have not as yet fallen under the notice of local observers; those identified are noted below.

1. *Trichophora epistylidis*, C. and L., occurs on zoodendria of *Carchesium polypinum*.

2. *Podophrya carchesii*, C. and L. Same.

3. *Podophrya cyclopum*, C. and L. On *Cyclops quadricornis*.

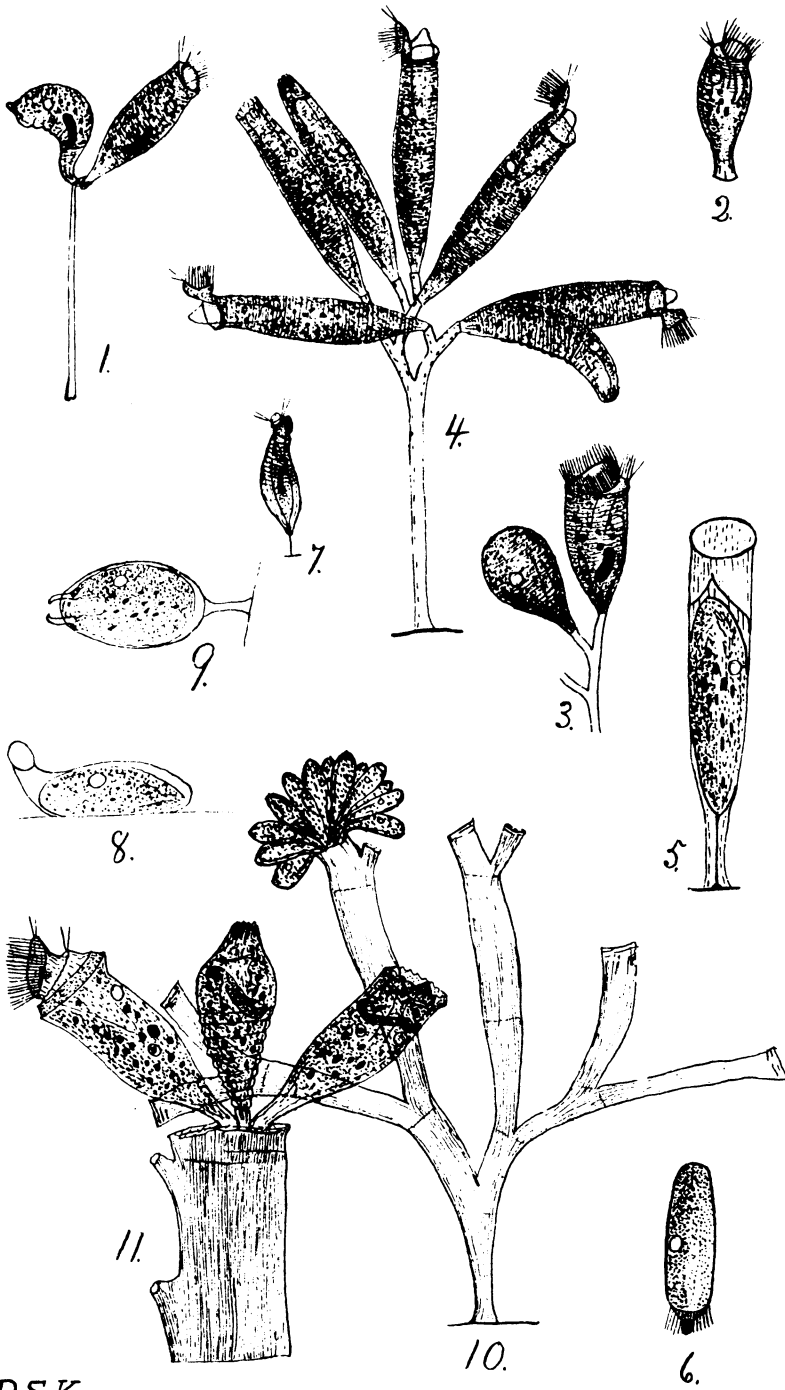
4. *Podophrya quadripartita*, C. and L. On *Epistylis plicatilis* and *Carchesium polypinum*.

5. *Acinta tuberosa*, Ehr. On a small species of *Mysis* sometimes taken in Lake Erie. I have not seen the form for several years and express a doubt concerning its identity. It is hoped that another opportunity will be presented for studying it.

6. *Acineta mystacina*, Ehr. On *Myrophyllum*.

7. *Dendrocometes paradoxus*, Stein. This organism is scarcely less interesting and singular than its neighbor *Dendrosoma radians*; the latter I have not encountered after much searching. It has been found in this country by Dr. Leidy, and should, doubtless does, exist in Western New York. The former species is not uncommon, at least, in May in forest puddles on *Gammarus pulex*. I have no difficulty in making out the "minute tubular axial canals forming a channel of communication from the exterior down the main branches into the body of the animalcule" as shown by Wrezesniowski. I have not, however, observed that the antler-like terminations of the radial arms have the power of grasping and holding other Infusoria.

Plate III.



D.S.K.

EXPLANATION OF PLATE III.

- Fig. 1. *Scyphidia inclinans*, D'Udekem; variety attached to seta of *Nais*.
× 380.
- Fig. 2. *Scyphidia Ovata*. × 380.
- Fig. 3. *Epistylis fugitans*, *n. s.* × 340.
- Fig. 4. *Opercularia elongata*, *n. s.* × 205.
- Fig. 5. *Thuricola innixa*, Stokes. × 195.
- Fig. 6. Migrating zooid of *Cothurnia lata*, D. S. K.
- Fig. 7. *Pyxicola striata*, *n. s.* × 250.
- Fig. 8. *Platycola longicollis*, Kent. Variety.
- Fig. 9. *Stylohedra lenticula*, *n. s.* × 320.
- Fig. 10. *Opercularia rugosa*, *n. s.* Pedicle with cluster of zooids on one branch.
× 40.
- Fig. 11. Same, showing three zooids attached to truncate branch. × 200.